

## **REMARKS**

Please reconsider the present application in view of the above amendments and the following remarks. Applicant thanks the Examiner for carefully considering the present application.

### **I. Disposition of Claims**

Claims 1-18 were pending in the present application. By way of the Response to the Restriction Requirement of June 29, 2004, claims 15-18 were withdrawn from consideration. Accordingly, claims 1-14 are currently pending in the present application.

### **II. Rejection(s) Under 35 U.S.C § 102**

Claims 1-14 of the present application were rejected under 35 U.S.C. § 102(b) as being anticipated by U.S. Patent No. 5,689,139 issued to Bui et al. (hereinafter "Bui"). For the reasons set forth below, this rejection is respectfully traversed.

The present invention is directed to a bump and vias structure that allows for increased uniformity of current distribution around the bump. *See* Specification, paragraph [0023]. With reference to the exemplary embodiment of the present invention shown in Figure 5a of the present application, a slot **54** is been formed in a region of a top layer **M8** between vias **50** and a bump **44**. *See* Specification, paragraph [0027]. Because current cannot flow across slot **54**, the effective current path length from the vias **50** in a central region of metal layer **M8** to the bump **44** is increased by the distance necessary for the current to flow around the slot **54**. *See* Specification, paragraph [0027]. Thus, it can be seen that the current flowing along arrow **53a** is reduced relative to the current

flowing along the same path without the slot as shown in Figure 4c of the present application, thereby reducing current crowding at the bump 44. *See* Specification, paragraph [0027]. Accordingly, independent claims 1 and 8 of the present application require, in part, a slot formed in the metal layer between the vias and the bump.

Bui, on the other hand, fails to disclose at least those limitations of the claimed invention discussed above. In Bui, elongated slots are formed through a metal interconnection line so that the total width of metal across the interconnection line is selected for optimum electromigration lifetime in accordance with the Bamboo Effect for that metal. *See* Bui, Abstract; column 1, line 61 – column 2, line 2; column 5, lines 5 – 24. For example, in Figure 3 of Bui, Bui discloses lots 33 that are formed in metal interconnection lines 30 and 31. However, Bui is completely silent as to the formation of slots in a metal layer between vias and a bump. The Examiner's characterization of element 53 in Figure 5 of Bui as a "bump" is incorrect in that element 53 is a plug "filling the via 51 through insulating layers 52." *See* Bui, column 7, lines 57 – 61. Those skilled in the art will clearly note that the conductive material used to fill a via is entirely distinct from an electrical bump formed on a metal layer. Accordingly, as Bui is altogether silent as to a bump, Bui necessarily cannot and does not disclose a slot formed in a metal layer between vias and a bump as required by independent claims 1 and 8 of the present application.

In view of the above, Bui fails to show or suggest the present invention as recited in independent claims 1 and 8 of the present application. Thus, independent claims 1 and 8 of the present application are patentable over Bui. Dependent claims are allowable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully

requested.

### **III. Rejection(s) Under 35 U.S.C. § 103**

Claims 1-14 of the present application were rejected under 35 U.S.C. § 103(a) as being unpatentable over Applicant's Admitted Prior Art and Bui. For the reasons set forth below, this rejection is respectfully traversed.

Like Bui discussed above, Applicant's Admitted Prior Art fails to disclose all the limitations of the claimed invention or supply that which Bui lacks. Applicant's Admitted Prior Art discloses a prior art bump and vias structure that is susceptible to current crowding at the bump. Applicant's Admitted Prior Art fails to disclose, or otherwise teach, a slot formed in a metal layer between vias and a bump. Further, there is no suggestion in Applicant's Admitted Prior Art to form structures or deformities in the metal layer between the vias and the bump to create increased current distribution at the bump. Accordingly, Applicant's Admitted Prior Art fails to disclose those limitations of the claimed invention not disclosed in Bui.

In view of the above, Applicant's Admitted Prior Art and Bui, whether considered separately or in combination, fail to show or suggest the present invention as recited in independent claims 1 and 8 of the present application. Thus, independent claims 1 and 8 of the present application are patentable over Applicant's Admitted Prior Art and Bui. Dependent claims are allowable for at least the same reasons. Accordingly, withdrawal of this rejection is respectfully requested.

#### IV. Conclusion

Applicant believes this reply is fully responsive to all outstanding issues and places the present application in condition for allowance. If this belief is incorrect, or other issues arise, the Examiner is encouraged to contact the undersigned or his associates at the telephone number listed below. Please apply any charges not covered, or any credits, to Deposit Account 50-0591 (Reference Number 03226.157001; P6865).

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Respectfully submitted,



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